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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Andrew Roman Chraplyvy

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EXAMINER

LEE, DAVID J

ART UNIT

PAPER NUMBER

2613

MAIL DATE

DELIVERY MODE

05/24/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

09/990,964

Applicant(s)

CHRAPLYVY ET AL.

Examiner

David Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 May 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,4-13,15 and 16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4-13,15 and 16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Arguments*

1. In view of the response filed on 5/2/2007, the final rejection mailed on 3/8/2007 is withdrawn and the new rejection is as follows:

Applicant's arguments with respect to the claims have been considered but are moot in view of the new grounds of rejection.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 5, 7, 8, 10-13, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atia et al. ("Demonstration of Return-to-Zero Signaling...", IEEE Lasers and Electro-Optics Society) in view of Murakami et al. (US Patent No. 6,307,985 B1).

Regarding claims 1, 5, 10, 11, and 16, Atia teaches an apparatus adapted for use in transmission in an optical communication system, comprising: a modulator (see "phase modulator" of Fig. 1b) for modulating an optical phase of pulses within a sequence of return-to-zero (RZ) pulses (the sequence of RZ pulses is generated by the first "M-Z" modulator of fig. 1b; see also 4<sup>th</sup> paragraph, second sentence: "The transmitter consists of a DFB laser externally modulated by a LiNbO3 Mach-Zehnder that is sinusoidally driven to *carve out RZ pulses*") in accordance with an input digital data stream to form an optical phase modulated signal (see also

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4<sup>th</sup> paragraph, third sentence: "These pulses [i.e. – the carved out RZ pulses] are subsequently modulated by another Mazh-Zehnder to encode *10 Gb/s NRZ data*), said modulator being one of phase shift keying (PSK), differential phase shift keying (DPSK), or quadrature phase shift keying (QPSK) modulator (this system is a DPSK arrangement – see e.g., title "...DPSK formats"). Atia does not expressly disclose that the optical transmission medium is dispersion managed. However, it is extremely common and usually necessary to manage dispersion along an optical transmission medium. Murakami teaches an optical transmission system comprising a dispersion managed medium utilizing a combination of second and third order dispersion having mutually opposite signs (fig. 1). It would have been obvious to a skilled artisan at the time of invention to incorporate the dispersion managed medium of Murakami in the system of Atia in order to reduce signal deterioration, to avoid the accumulation of third order dispersion and to increase system capacity and transmission distance (see e.g., col. 4, lines 15-27).

Regarding claim 7, the combined invention of Atia and Murakami teaches that the medium is a long-haul transmission medium adapted for transmitting solitons (the medium is a fiber, which is adapted for transmitting solitons).

Regarding claim 8, the combined invention of Atia and Murakami teaches that the medium is adapted for transmitting pulses that disperse as they propagate along the medium (this is an inherent property of an optical pulse).

Regarding claim 12, the combined invention of Atia and Murakami teaches that the apparatus further comprises a receiver including a delay demodulator for receiving the optical phase modulated signal from the dispersion managed optical transmission medium (note receiver

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of fig. 1b of Atia; see also middle of 4<sup>th</sup> paragraph: “the receiver incorporates a Mach-Zehnder *demodulator with a 1-bit time delay* followed by a 10 GHz balanced detector).

Regarding claim 13, the combined invention of Atia and Murakami teaches that the apparatus further comprises a balanced receiver for recovering said input data from the phase modulated signal (note receiver of fig. 1b of Atia; see also middle of 4<sup>th</sup> paragraph: “the receiver incorporates a Mach-Zehnder demodulator with a 1-bit time delay followed by a 10 GHz *balanced detector*).

Regarding claim 15, the combined invention of Atia and Murakami teaches a discrete or distributed means of erbium-doped fiber amplification or Raman amplification (see EDFA of fig. 1b).

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atia in view of Murakami and in further view of Ono et al. (US Patent No. 6,097,525).

Regarding claim 4, the combined invention of Atia and Murakami teaches the limitations of claim 1 but does not expressly disclose that the modulator is a PSK modulator. However, PSK modulation schemes are well known in the art, as is disclosed and illustrated by Ono (col. 8, lines 2-8; fig. 12) and are one of a plurality of modulation formats available to an artisan. A skilled artisan would have been motivated to use a PSK modulator in order to take advantage of the superiority in noise-proof capabilities characterized in PSK schemes. Therefore it would have been obvious to a skilled artisan at the time of invention to use the PSK modulation technique of Ono in the system of Atia and Murakami in order to allow transmission of healthier signals.

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atia in view of Murakami and in further view of Tzukerman et al. (US Patent No. 6,724,829).

Regarding claim 6, the combined invention of Atia and Murakami teaches the limitations of claim 1 but does not expressly disclose that the modulator is a QPSK modulator. However, QPSK modulation is a modulation scheme well known in the art of data encoding and is one of a plurality of modulation formats available to an artisan. For example, Tzukerman discloses a QPSK modulator (314 of fig. 3, and col. 4, lines 56-57). It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate a QPSK modulator as indicated by Tzukerman in the system of Atia and Murakami because QPSK modulation has the advantages of high spectral efficiency and low bit error rate (col. 4, lines 56-61).

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Atia in view of Murakami and in further view of Fukuchi (5,745,613).

Regarding claim 9, the combined invention of Atia and Murakami teaches the limitations of claim 1 but does not expressly disclose that the transmitter further includes a WDM to combine an output signal of the modulator with other phase modulated signals having optical carriers with different wavelengths. However this structure is well known in the art. For example, Fukuchi teaches a WDM to combine an output signal of the modulator with other modulated signals having optical carriers with different wavelengths (see fig. 1). It would have been obvious to a skilled artisan at the time of invention to multiplex several modulated signals

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together as indicated by Fukuchi in order to efficiently utilize the bandwidth in the transmission in the system of Atia and Murakami.


7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Lee whose telephone number is (571) 272-2220. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



David Lee  
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